

REMARKS

1. Amendment to Claims 15, 18, and 30

Applicant has amended independent claims 15 and 30 by replacing the "comprising" with -- consisting of-- with regard to the composition of the epoxy-modified urethane resin.

Additionally, the structure of the epoxy-modified urethane presented in claim 16 was incorporated in claim 15. Claim 16 is now canceled.

Claim 18 is amended to depend from independent claim 15.

Claim 30 is also amended to include that R₁ is an aliphatic hydrocarbon radical as previously claimed.

Basis for these amendments is found in the specification as originally filed. Applicant submits that the present amendments do not introduce any new matter.

2. Rejection of Claims 15, 16, 18, 20, 31, 33 and 34 under 35 U.S.C. § 112, first paragraph.

Claims 15, 16, 18, 20, 31, 33 and 34 are rejected under 35 U.S.C. § 112, first paragraph, as allegedly failing to comply with the written description requirement. In view of the amendments to the claims 15 and 30 herein, Applicant respectfully submits the rejection is moot.

3. Rejection of Claims 15, 16, 18, 30, 31, 33 and 34 under 35 U.S.C. § 112, second paragraph.

Claims 15, 16, 18, 30, 31, 33 and 34 are rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In view of the amendments to the claims 15 and 30 herein, Applicant respectfully submits the rejection is moot.

4. Rejection of Claims 15, 16, 18, 30, 31, 33 and 34 under U.S.C. § 103(a)

Claims 15, 16, 18, 30, 31, 33 and 34 are rejected under U.S.C. § 103(a) as allegedly being unpatentable over Okuri et al., Saito et al. '502, Lohse, Japanese '882, '877 and '052 in view of Eadara and the Vincent et al. article and Wang et al. and Soviet Union '508. Applicant respectfully traverses this rejection for at least the reason that the cited references fail to teach or suggest each element of the claims.

A. Relevant Law

The United States Patent and Trademark Office (USPTO) has the burden of showing a prima facie case of obviousness. In re Bell, 991 F.2d 781, 783 (Fed. Cir. 1993). In determining obviousness, the invention must be considered as a whole, and the claims must be considered in their entirety. Medtronic, Inc. v. Cardiac Pacemakers, Inc., 721 F.2d 1563, 1567 (Fed. Cir. 1983). A prima facie case of obviousness is established when the teachings from the prior art itself would have suggested the claimed subject matter to a person of ordinary skill in the art. In re Rhinehart, 531 F.2d 1048, 1051 (CCPA 1976). More specifically, the requirements for establishing a prima facie case of obviousness include: (1) there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings; (2) there must be a reasonable expectation of success; and (3) the prior art reference (or references when combined) must teach or suggest all the claim limitations.

When a rejection depends on a combination of prior art references, the USPTO must show that there is some teaching, suggestion, or motivation to combine the references. In re Geiger, 815 F.2d 686, 688 (Fed. Cir. 1987). The mere fact that the prior art could be modified would not have made the modification obvious unless the prior art suggested the desirability of the modification. In re Gordon, 733 F.2d 900, 902 (Fed. Cir. 1984). The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. In re Vaeck, 947 F.2d 488 (Fed. Cir. 1991). Finally, obviousness may not be established using hindsight. W.L. Gore & Assocs., Inc. v. Garlock, Inc., 721 F.2d 1540, 1551 (Fed. Cir. 1983).

B. Cited References

1. Okuri et al. (US Patent No. 4,943,604)

Okuri et al. teaches a structural adhesive with anti-corrosive properties useful, for example, in the automotive industry. The adhesives taught by Okuri et al. include a rubber modified epoxy resin prepared by reacting a bisphenol epoxy resin and a butadieneacrylonitrile-(meth)acrylic acid copolymer, a urethane modified epoxy resin, a latent curing agent and a rust inhibiting pigment. The rust inhibiting pigment includes aluminum orthophosphate and a zinc

compound. Importantly, Okuri et al. fails to teach or suggest applying a conductive adhesive to a substrate wherein the conductive adhesive includes an epoxide-modified polyurethane resin, a cross-linking agent, an adhesion promoter, and a conductive filler.

2. Saito et al. (US Patent No. 5,194,502)

Saito et al. '502 teaches an epoxy resin combined with a polyester resin optionally modified with rubber. The compositions of Saito et al. '502 are useful, for example, in the automotive industry. In particular, Saito et al. '502 teaches an adhesive having a mixture of bisphenol epoxy resins, a urethane-modified epoxy resin and/or an acrylonitrile/butadiene (NBR)-modified epoxy resin with 10 to 300 parts of a polyester resin, 0.1 to 30 of a latent curing agent. Notably, Saito et al. does not teach or suggest applying a conductive adhesive to a substrate wherein the conductive adhesive includes an epoxide-modified polyurethane resin, a cross-linking agent, an adhesion promoter, and a conductive filler.

3. Lohse (US Patent No. 3,624,178)

Lohse teaches epoxy terminated polyurethane compositions that can contain fillers such as metal powders including aluminum. Lohse does not teach or suggest applying a conductive adhesive to a substrate wherein the conductive adhesive includes an epoxide-modified polyurethane resin, a cross-linking agent, an adhesion promoter, and a conductive filler.

4. Japanese Patent 601206882 ('882)

The '882 patent teaches an adhesive for bonding steel sheets including an epoxy-urethane adhesive and a latent curing agent. The reference fails to teach or suggest the inclusion of metal fillers, conductive or otherwise. Additionally, the reference fails to teach or suggest an adhesion promoter. More specifically, the reference fails to teach or suggest applying a conductive adhesive to a substrate wherein the conductive adhesive includes an epoxide-modified polyurethane resin, a cross-linking agent, an adhesion promoter, and a conductive filler.

5. Japanese Patent 60235877

JP Patent No. 60235877 (the '877 patent) teaches an epoxy-modified urethane composition useful in electrodeposition. The composition includes 1-30 parts latent curing agent and 2-200 parts electrically conductive material such as carbon powder or graphite powder, and optionally a rust inhibitor. The '877 patent does not teach or suggest an adhesive that can be

used as a solder replacement in electronics packaging. In particular, the reference fails to teach or suggest an epoxide-modified polyurethane resin including a cross-linking agent, an adhesion promoter, and a conductive filler.

6. Japanese Patent 49097052

JP Patent '052 teaches an adhesive composition formed by mixing a modified urethane resin, an epoxy resin, and a curing agent. The composition can also include 30 parts aluminum powder. The reference does not teach or suggest a conductive adhesive includes an epoxide-modified polyurethane resin, a cross-linking agent, an adhesion promoter, and a conductive filler.

7. Eadara (US Patent No. 5,198,065)

Eadara teaches a composition for bonding steel to wood. The composition includes a low viscosity primer and an adhesive. The adhesive component includes a diglycidyl ether resin and an epoxy silane. Eadara teaches that the adhesion promoter provides the cured adhesive resistance to moisture and can be present in the composition from 0.2 to 3 weight percent. The compositions of Eadara are particularly useful for the preparation of railroad ties (col. 5, lines 14-16). Eadara does not teach or suggest a conductive adhesive includes an epoxide-modified polyurethane resin, a cross-linking agent, an adhesion promoter, and a conductive filler.

8. Vincent et al.

Vincent et al. teaches using organofunctional silanes in epoxy underfill formulations to bond organic materials to inorganic materials. Vincent et al. also teaches that the purpose of the underfills is to reduce the stresses on the solder joint interconnects of flip chips by closely matching the coefficient of thermal expansion of the solder while providing rigidity and strength to the interconnects. Vincent et al. does not teach or suggest a conductive adhesive includes an epoxide-modified polyurethane resin, a cross-linking agent, an adhesion promoter, and a conductive filler.

9. Wang et al. (US Patent No. 5,686,541)

Wang et al. teaches an epoxy-urethane composition useful as an underfill encapsulant. The epoxy-urethane compositions includes a siloxane. Wang et al. does not teach or suggest a conductive adhesive including an epoxide-modified polyurethane resin a cross-linking agent, an adhesion promoter, and a conductive filler.

10. Soviet Union Patent 1628508

SU 1628508 (SU '508) teaches an epoxy resin including, among other things, an oligo-urethane-diepoxy and silver powder. The composition is useful for the assembly of semiconductor devices. SU '508 does not teach or suggest an epoxide-modified polyurethane resin; a cross-linking agent; an adhesion promoter in the range of 0.2 to 10 weight percent; and a conductive filler, in the range of 5 to 95 weight percent, wherein the adhesive maintains electrical conductivity between the joined electrically conductive electronics packaging materials and enables the joined electrically conductive electronics packaging materials to remain joined after a plurality of drops from 36 inches.

C. Analysis

The Office Action maintains the rejection of the claims 15, 16, 18, 30, 31, 33 and 34 over Okuri et al., Saito et al. '502, Lohse, Japanese patents '882, '877, and '052 in view of Eadara and Vincent et al. and Wang et al. and Soviet Union '508 for the reasons presented in a prior office action. The Office Action mailed on June 7, 2002, (Paper No. 12) provides that it would have been obvious to one of ordinary skill in the art to combine the epoxy silane adhesive taught in Eadara or Vincent et al. with the epoxide modified urethanes of Okuri et al., Saito et al. '502, Lohse, Japanese patents '882, '877, and '052 to impart moisture resistance as well as decrease the viscosity, contact angle and flow time while increasing the adhesion of the adhesive to the conductive filler.

The present Office Action asserts that although the moisture resistance advantage recognized by Eadara et al. is not the same as the claimed adhesion promoter, this difference does not negate the rationale for combining the adhesion promoter with the adhesives taught in the cited references.

Applicant notes that the Office Action mailed on September 13, 2002 (Paper No. 16) indicates that use of the term "comprising" with regard to composition of the epoxy-modified urethane did not exclude the epoxy resins of Okuri et al., Saito et al. '502, and the Japanese patents. Applicants have amended the claims to replace the term "comprising" with the term "consisting of--". In view of this amendment, Applicant submits the rejection of the pending

claims over these references is overcome because the cited references do not teach each element of the claimed subject matter.

5. Rejection of Claims 15 and 18 under 35 U.S.C. 103(a)

Claims 15 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang et al., Japanese '232, the Soviet Union patent and Saito et al. '136 in view of Eadara et al. and Vincent et al. for reasons of record.

The Office Action mailed May 6, 2003, (Paper No. 23) asserts that claims 15 and 18 do not require the structure recited in claims 16 and 30. Applicant has amended claim 15 to recite the structure of claim 16. Claim 18 was amended to depend from claim 15. Accordingly, Applicant submits the rejection of the claims is overcome because the cited references do not teach each element of the claimed subject matter.

6. Rejection of Claims 16, 30 and 31 are rejected under 35 U.S.C. 103(a)

Claims 16, 30 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Soviet Union patent in view of Okuri et al., Lohse and Japanese '052. Applicant notes that the claims have been amended to replace the term "comprising" with the term "consisting of" with regard to the epoxy-modified urethanes. Accordingly, Applicant submits that the cited references do not teach each element of the claims, and therefore, cannot render the claims obvious.

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CONCLUSION

In light of the foregoing amendments and for at least the reasons set forth above, Applicant respectfully submits that all rejections have been traversed, rendered moot, and/or accommodated, and that the now pending claims are in condition for allowance. Favorable reconsideration and allowance of the present application and all pending claims are hereby courteously requested. If, in the opinion of the Examiner, a telephonic conference would expedite the examination of this matter, the Examiner is invited to call the undersigned agent at (770) 933-9500.

Respectfully submitted,



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